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ALKALOIDS OF *TABERNANTHE IBOGA*

Tabernanthe Iboga Baill., found in the Gabun district of French West Africa, where it is known as Iboga, has received much attention in France from economic botanists and pharmacologists since 1867, when it first appeared in Europe. An interesting account of work done with it was published in 1940 by Raymond-Hamet,[1] from which it appeared that little is known of its components beyond the fact that it contains amorphous alkaloids and a crystalline alkaloid *ibogaine*, possibly accompanied by a second, crystalline alkaloid, m.p. 206–7°. According to the same author,[2] ibogaine has the formula $C_{19}H_{24(26)}ON_2$ and yields a hydrochloride, B . HCl, $[\alpha]_D^{15°} - 37{\cdot}3°$ (H_2O) or $- 67{\cdot}1°$ (MeOH). Older figures for the base itself are m.p. 152°, $[\alpha]_D - 48{\cdot}3°$ (EtOH) or $- 12{\cdot}88°$ (C_6H_6).[3] It contains one methoxyl group ; gives indole colour reactions,[4] and on distillation with zinc dust or soda-lime yields products showing reactions of indole, or indole derivatives with the β-position free. The ultra-violet absorption spectrum, according to Brustier *et al.*,[5] resembles that of quinoline rather than that of indole.

More recently Delourme-Houdé [2] has also isolated ibogaine, to which he assigns the formula $C_{20}H_{26}ON_2$. He has also named and assigned a formula to the second alkaloid, *viz. tabernanthine*, $C_{21}H_{28}ON_2$. It forms needles or orthorhombic plates, m.p. 209°, $[\alpha]_D - 40°$ (acetone), gives a hydrochloride readily soluble in chloroform, contains one methoxyl group and is unsaturated. The ultra-violet absorption spectrum shows maxima at 2,700 and 3,000 A and minima at 2,575 and 2,800 A, whereas ibogaine has a maximum at 2,950 A and a minimum at 2,575A. It gives indole colour reactions with glyoxylic and phosphovanillic reagents.

The amorphous alkaloids include a substance, giving fluorescent solutions in organic solvents, which is thought to be a decomposition product of ibogaine.

Methods for the isolation and estimation of the alkaloids of the root are described. The seeds of the plant contain alkaloids giving colour reactions different from those of the root alkaloids.

Iboga is used by natives of the Gabun in much the same way as coca is used by South American Indians and that aspect of its action has been discussed by Raymond-Hamet,[6] who has also published a series of papers dealing with its action on isolated organs and the intestine.[7] Like cocaine, ibogaine potentiates the pressor action of adrenaline and abolishes the sino-carotid reflexes, but unlike it also augments considerably the action of tyramine, and slightly that of *dl*-ephedrine.[8] According to Vincent and Sero it inhibits the action of serum cholinesterase.[9]

Delourme-Houdé [2] finds that tabernanthine injected into dogs is hypotensive, decreases the rate and amplitude of respiration, reduces the reflex hypertension induced by occlusion of the carotids and, like ibogaine, increases the hypertension produced by injection of adrenaline but also prolongs the hypotension resulting from injection of acetylcholine.

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ALKALOIDS OF *TAXUS BACCATA*

Taxine, $C_{37}H_{51}O_{10}N$, is contained in the leaves, shoots and fruits of the yew (*Taxus baccata*), from which it was first isolated by Lucas.[1] It was investigated by Marmé,[2] Hilger and Brande,[3] Amato and Capparelli,[4] Thorpe and Stubbs,[5] Winterstein *et al.*,[6] Kondo *et al.*,[7] Takahashi [8] and Gulland *et al.*[9]

A phytochemical investigation of taxine in the yew has been conducted by Kuhn and Schäfer,[12] who have devised special methods for the detection, estimation and purification of the alkaloid. Masson [13] states that *Taxus canadensis* contains an alkaloid giving the colour reactions of taxine but different from it in being crystalline and having m.p. 238–9° ; no ephedrine was present.

Taxine is amorphous, as are also its derivatives, and special methods have to be used in isolating it in a pure state. Gulland and Virden [9] have shown that ephedrine is also present in the yew.

Taxine, in the purest form in which it has yet been obtained, has m.p. 121–4° after sintering at 115°, $[\alpha]_D^{17°} + 95{\cdot}7°$ (EtOH).[9] It is soluble in ether, chloroform or alcohol, but insoluble in water or light petroleum. The salts are amorphous, including the aurichloride, m.p. 132–4° (two forms, m.p. 90–105°, 110°, Kondo). The methiodide has m.p. 123–5°, and with alkali produces trimethylamine and a product, $C_{35}H_{44}O_{10}$, m.p. 120–140°. Taxine, on reduction, takes up four atoms of hydrogen and forms a tetrabromide on addition of bromine. On oxidation with permanganate, benzamide, benzoic acid, acetic acid, oxalic acid and benzonitrile are stated to be produced. Cinnamic acid seems to be a constant product of the action of alkalis and acids on the alkaloid. Warmed with dilute sulphuric acid for ten hours, taxine yields a crystalline compound, $C_{11}H_{15}O_2N$, which may be a β-dimethylamino-β-phenylpropionic acid.[6] Winterstein and Guyer [6] suggest the following partial formula from the observations so far made : $NMe_2 . CHPh . CH_2 . CO . C_{24}H_{34}O_6 . OAc$. Callow, Gulland and Virden [9] obtained evidence of the presence of four replaceable hydrogen atoms and of a lactone group, thus accounting for six out of the ten oxygen atoms required by the formula. The remaining